July 21, 1936. F. A. GAUGER 2,048,065

GAS RANGE AND AUTOMATIC LIGHTER THEREFOR

Original Filed March 7, 1932 2 Sheets-Sheet 1

Fig. 1

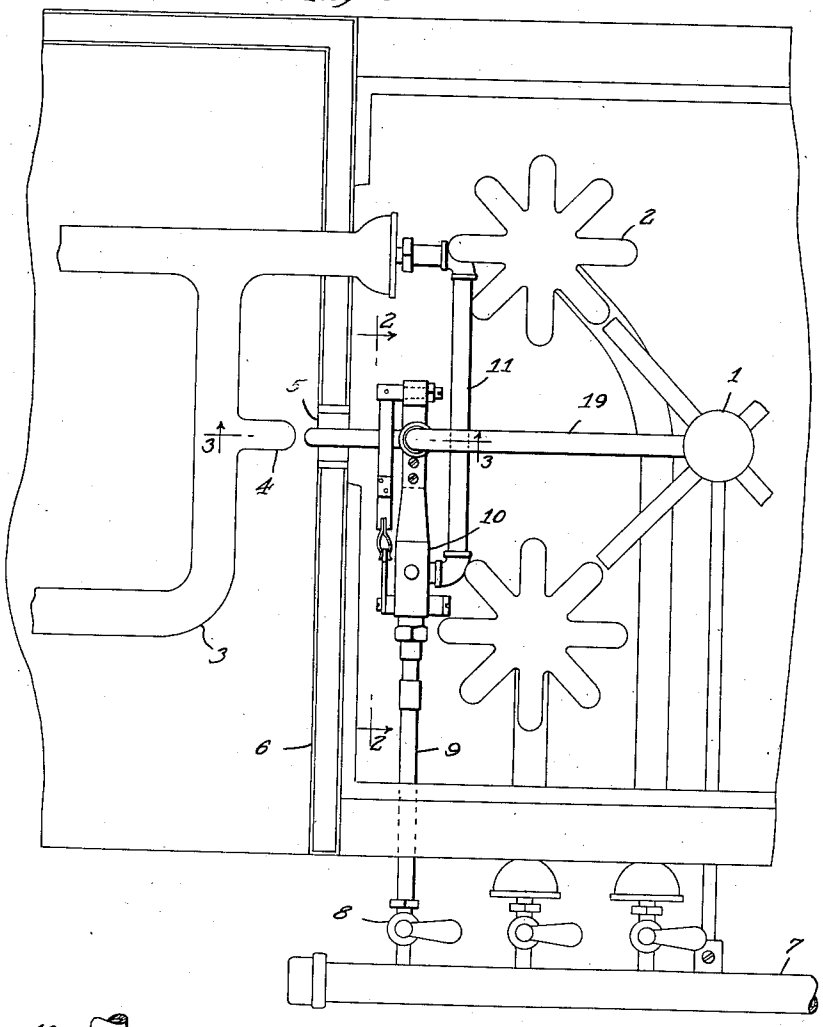
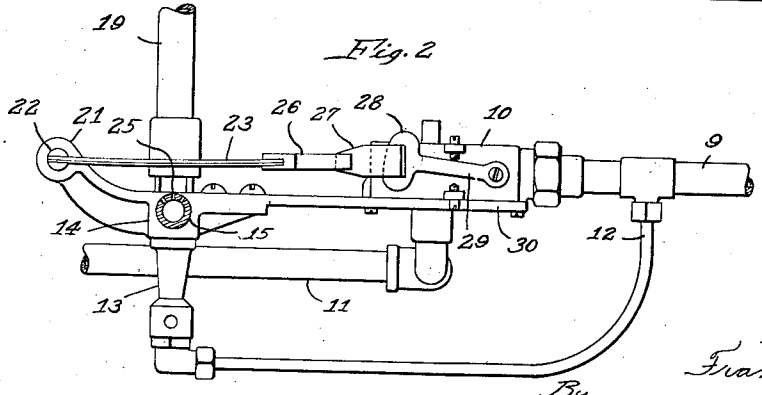


Fig. 2



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Original Filed March 7, 1932 2 Sheets-Sheet 2

Fig. 3.

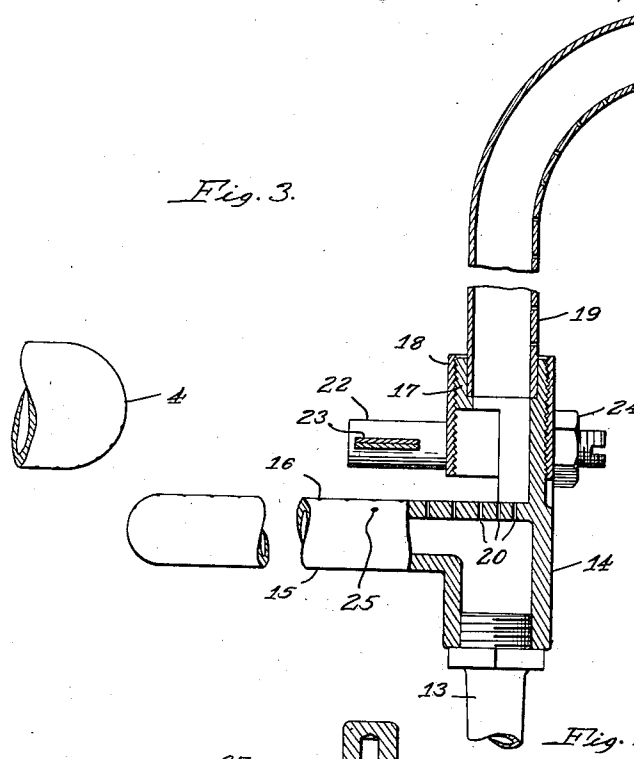


Fig. 6

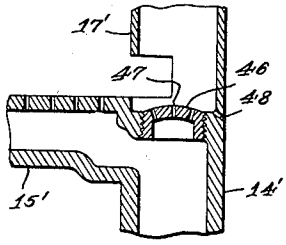


Fig. 4

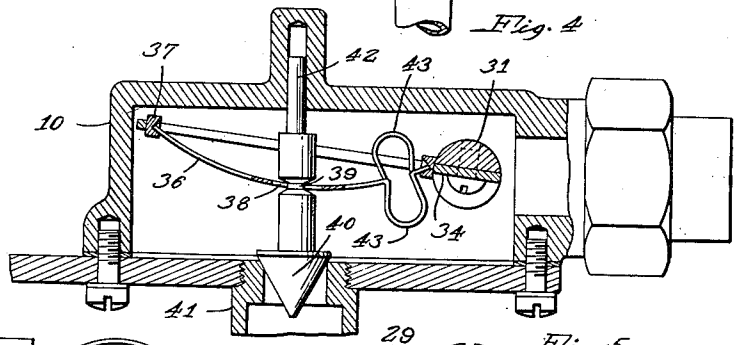
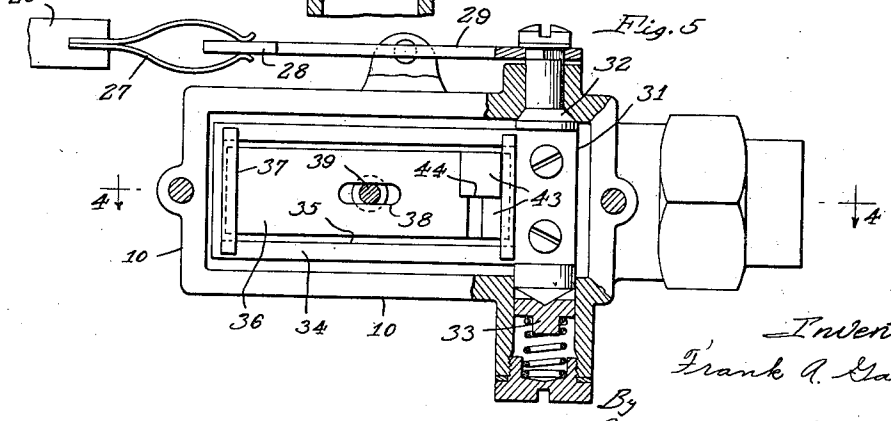


Fig. 5



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UNITED STATES PATENT OFFICE

2,048,065

GAS RANGE AND AUTOMATIC LIGHTER THEREFOR

Frank A. Gauger, Milwaukee, Wis., assignor to Geo. D. Roper Corporation, Rockford, Ill., a corporation of Illinois

Original application March 7, 1932, Serial No. 597,124. Divided and this application April 14, 1932, Serial No. 605,231

1 Claim. (Cl. 126—39)

This is a division of my application, Serial No. 597,124, filed March 7, 1932, for Ignition devices.

This invention relates to gas ranges and has particular reference to automatic lighters therefor, and still more particularly, automatic lighters capable of lighting an oven burner at a lower elevation than the pilot light relied upon.

Objects of this invention are to provide a novel form of automatic lighter in which an auxiliary pilot burner is provided at the same low elevation with the oven burner and in lighting proximity thereto, the auxiliary pilot being ignited through a flash tube extending upwardly therefrom to a main pilot burner, and in which the auxiliary pilot controls the functioning of the oven burner so that fuel cannot be supplied to the burner unless the auxiliary pilot is lighted. The invention, therefore, permits the automatic lighting of an oven burner from a main pilot, although the oven burner is located, as in the new types of stoves, at a point spaced laterally from the main pilot and in a plane considerably below the main pilot.

In greater detail this invention has for its further objects the provision of novel means for charging a flash back tube by means producing a body of gas which on entering the tube limits the secondary air admission, and to so construct the flash back tube that provision is made along the length of the tube for secondary air admission.

This invention is suitable for use with any type or shape of flash back tube, but what is particularly noteworthy about it is that it permits the use of a flash back tube which has a relatively long vertical portion and a relatively long horizontal portion, and at the same time insures the correct functioning of the flash back tube even under widely varying conditions of fuel supply.

Embodiments of the invention are shown in the accompanying drawings in which—

Figure 1 is a fragmentary plan view somewhat diagrammatically shown, illustrating the position of the device relative to the other parts on the stove and showing one application of the invention;

Fig. 2 is a sectional view on the line 2—2 of Figure 1;

Fig. 3 is a sectional view approximately on the line 3—3 of Figure 1;

Fig. 4 is a sectional view through the valve casing, said view corresponding to a section on the line 4—4 of Fig. 5;

Fig. 5 is a view of the valve structure with the cover plate removed and with parts broken away, and

Fig. 6 is a fragmentary detail view showing a modified form of construction.

These drawings are the same as the drawings in my parent application, above mentioned, and include a snap action thermostatic valve constituting the subject matter of the invention in my said parent application. It should be distinctly understood, therefore, that the invention claimed in the present application is not limited to use with said thermostatic valve, nor to the system of ignition disclosed. Instead, the present invention deals primarily with those features disclosed herein involving the flash back tube functioning between a burner to be lighted and an ignition device located substantially above and horizontally remote from said burner. This condition is a problem in connection with the comparatively recent trend in design in gas stoves and ranges characterized by so-called low ovens, in which the oven burner is located considerably below the burners making up the cooking top, in some cases the cooking top being substantially on the same level as the top of the oven. In this type of stove it is desired to ignite the low oven burner from an igniting device, such as a constantly burning pilot light located in the region of the cooking top and serving to ignite the cooking top burners. My present invention provides a means for igniting the low oven burner from an ignition device substantially above and remote from the oven burner.

Referring to the drawings, it will be seen that the device has been shown as applied to a gas stove provided with a main pilot 1, top burners 2, and an oven burner 3. The oven burner is provided with a projecting portion 4 adjacent the opening 5 through the oven wall 6.

All of the burners and pilots of the stove are supplied from the manifold 7. The oven burner and its associated auxiliary pilot hereinafter described are both supplied through the valve 8 which controls the flow of gas from the manifold 7 to the pipe 9.

The pipe 9 extends to the automatic thermostatically controlled valve indicated generally by the reference character 10, see Figures 1 and 2, and from this valve a pipe 11 leads to the oven burner.

It is to be noted from Fig. 2 that a by-pass pipe 12 is provided and extends from the pipe 9 to the mixing tube 13 of the auxiliary pilot where primary air is entrained with the gas to produce a mixture for a Bunsen flame at 16, 20, and 25.

From Fig. 3 it will be seen that this auxiliary pilot has the mixing tube 13 screwed into a casting 14, which is provided with a lateral extension 15, having a plurality of holes 16 and projecting through the aperture 5, see Figure 1, into proximity to the member 4. The relationship of the parts in a vertical plane is shown in Fig. 3.

It is to be noted that the casting 14 of the auxiliary pilot is provided with an extension having an annular threaded portion 17 upon which an adjustable sleeve 18 is screwed to thereby limit the entrance of secondary air into a flash back tube 19 fitted within the annular extension 17, such flash back tube being hereinafter described in greater detail. The casting 14 is provided with a cluster burner immediately below the adjustable sleeve 18, the holes of such burner being indicated by the reference character 20 in Fig. 3. This cluster burner may be of any suitable type, an additional form of cluster burner being shown in Fig. 6 which will be described later.

The casting 14 is provided with an arm 21, see Fig. 2, to which the pin 22 is rigidly secured. This pin carries the thermostatic member 23 and is adapted to be locked in any desired adjusted position by means of the nut 24, see Fig. 3.

It is to be noted from Fig. 2 that the burner 15 of the auxiliary pilot is provided with a plurality of openings 25 which cause a plurality of flames to play upon the thermostatic member 23 whenever such auxiliary pilot is lighted and thereby heat the major portion of this thermostatic member and secure a pronounced and rapid response, causing the thermostatic member to move within an extremely brief period after the lighting or extinguishing of the auxiliary pilot.

The thermostatic member 23 carries a fitting 26 on its free end which is provided with a pair of bowed spring or friction jaws 27 most clearly shown in Fig. 5. These spring jaws 27 frictionally grip an enlarged portion 28 of a valve controlling arm 29 to communicate a limited amount of oscillatory movement of the arm, suitable adjustable stops being provided as indicated in Fig. 2, to limit the oscillatory movement.

The automatic valve 10 is carried in any suitable manner as by means of a plate 30 secured at one end to the casting 14, as may be seen from Fig. 2.

The valve arm 29 is rigidly secured to the rock shaft 31, see Fig. 5. This rock shaft has a reduced portion which extends through the wall of the casing of the valve and is provided with a ground beveled surface or collar 32 integral therewith and bearing upon a beveled seat formed in the casing of the valve, as very clearly shown in Fig. 5, to thereby maintain a gas tight joint without any packing whatsoever. The other end of the shaft 31 is beveled and a follower 33 is spring pressed against such beveled end to maintain a gas tight fit between the surface 32 and the casing.

An arm 34 is rigidly secured to the rock shaft 31 and is provided with a central cut out portion 35 within which a bowed spring 36 is positioned. The ends of the bowed spring are carried within members 37, provided with V-shaped slots, as shown in Fig. 4, and provided with forked ends which interfit with corresponding portions of the arm 34. The bowed spring is approximately centrally slotted, as indicated at 38, and fits loosely over a reduced portion 39 formed on the stem of the valve 40, the valve 40 cooperating with a fitting 41 provided with a valve seat and having an extension 42 guided by the casing of the valve, as shown in Fig. 4.

The bowed spring 36 is slitted adjacent one end and oppositely bowed loops 43 are formed from the two half strips of the spring produced by this slit, such slit being indicated at 44 in Fig. 5.

When the rock arm 31 is rocked in a counterclockwise direction, as viewed in Fig. 4, the spring 36 will be tensioned and will finally snap suddenly upwardly or, in other words, will suddenly bow upwardly, thereby raising the valve 40 as viewed in Fig. 4 and opening such valve with a quick motion. A reverse rocking action of the rock shaft 31 will cause the spring to suddenly bow downwardly, as shown in Fig. 4, thereby closing the valve with a snap action.

The slip clutch obtained between the spring jaws 27 carried by the thermostatic member and the portion 28 of the rock arm 29 previously described insures the operation of the valve during the initial motion from either position of the thermostatic member. This slip connection permits the thermostatic member to complete its entire stroke without producing straining of any of the parts, as the jaws 27 simply slip on the member 29 to accommodate the additional movement of the thermostatic member.

However, a very pronounced beneficial result is obtained by this construction, for it will be noted that the initial movement of the thermostatic member actuates the valve and consequently a very quick response is obtained, as the thermostatic member does not have to complete its entire stroke in either direction to either open or close the valve.

Further, by combining this construction with that of the snap acting valve an extremely quick and positive response is obtained during the initial portion of the stroke of the thermostatic member in either direction, thereby fully opening or fully closing the valve during this initial portion of the stroke of the thermostatic member.

Returning to the flash back tube 19, attention is called to the fact that this tube extends upwardly and thereafter laterally to adjacent the main pilot 1, as may be seen from Figures 1 and 3. The flash back tube 19 is provided with a series of apertures 45 on the underside of the horizontal portion thereof and on the adjacent side of the vertical portion. These apertures provide for the additional admission of secondary air. The admission of secondary air at the charging point of this tube is regulated by means of the adjustable sleeve 18, and also is limited not only by this sleeve but by the use of the cluster burner immediately below the sleeve. The cluster burner produces a body of mixture substantially conforming to the interior contour of the adjacent portion of the flash back structure.

In other words, the cluster burner, which will be more fully described in connection with Fig. 6, produces a cylindrical body or column of mixture which limits the entrance of secondary air and consequently provides for a reasonable rate of travel of the mixture through the flash back tube 19, thereby allowing the flame which flashes back to be readily propagated at a rate in excess of the upwardly and outwardly traveling rate of the mixture.

It is believed that a consideration of Fig. 6 at this point will materially aid in the understanding of the invention. In this figure the casting 14' corresponds to that previously described and constitutes the auxiliary pilot 15' corresponding to the portion 15 of Fig. 3. However, a cluster burner tip or fitting 46 is inset below the upper level of the auxiliary pilot and is provided with

a plurality of apertures 47 so as to insure the formation of a cylindrical or other shaped body of mixture which substantially fills the lower end of the flash back tube or corresponding portion of the structure. In the form shown in Fig. 6, the casting 14' is provided with an annular portion 17' which may terminate sufficiently close to the auxiliary pilot face to avoid the necessity of using an adjustable sleeve 18, although it is to be distinctly understood that the adjustable sleeve may or may not be used with either form of the invention. Also, if desired, an individual fitting corresponding to the fitting 46 may be employed with the structure as illustrated in Fig. 3.

Returning a moment to Fig. 6, it will be noted that the cluster burner or fitting 46 is located in a plane below the upper face of the auxiliary pilot so that if there is a pressure wave from any source whatsoever, it cannot snuff out the cluster burner. If desired, an additional aperture 48 may be provided through the casting 14', as shown in Fig. 6, for the admission of secondary air.

In operating the device, the valve 8 is opened and gas passes to the auxiliary pilot. The cluster burner fills the tube 19 with a charging mixture which may be comparatively rich and which may be diluted to the proper amount by the admission of secondary air along the length of the tube through the apertures 45, see Fig. 3. This mixture is ignited by the main pilot 1 and the flame flashes back and lights the auxiliary pilot. The thermostatic member 23 heated by the several small flames from the apertures 25 is substantially immediately bowed and snaps the oven valve into open position during the initial portion of the stroke of the thermostatic member. The auxiliary pilot lights the oven burner and thus an automatic operation is secured with absolute protection against the supplying of the oven burner with gas if the auxiliary pilot should fail for any reason whatsoever.

It will be seen that this invention enables an oven burner which is located at a point remote from and in a plane below that of the main pilot to be lighted from the main pilot with the utmost ease and certainty and in an extremely brief interval of time.

Further, it will be seen that an automatic valve has been provided which is thermostatically operated to completely open or completely close during the initial operation of the stroke of the thermostatic member.

It will be seen further that the device is extremely simple, has relatively few parts, and that it is substantially fool proof in its operation and requires no thought on the part of the operator.

I claim:—

The combination in a gas stove, having a cooking top, and an oven alongside but below the cooking top, of a main pilot on the cooking top, a second pilot located at a point remote from said main pilot and in the lower plane of the oven below said main pilot, a flash back tube extending from adjacent said second pilot, upwardly and then laterally to a point adjacent said main pilot, means for charging said tube with a mixture of fuel and primary air, and adjustable means for varying the admission of secondary air to said tube at a point adjacent the charging point of said tube.

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